

6. Patent Claims

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1: Method of run-time reconfiguration of programmable units with a two- or multi-dimensional cell architecture (e.g., FPGAs, DPGAs, DFPs, etc.), characterized in that

1. there are one or more PLUs which respond to signals, regardless of type, and can recognize and process special PLU commands within a configuration program consisting of data and commands, and can calculate an entry in a jump table on the basis of the source of an event, and
2. there are one or more jump tables for discovering the address, which was calculated, of the configuration data to be loaded,
3. there are one or more configuration memory areas into which one or more configuration programs are loaded,
4. there are one or more FIFO memory areas to which configuration data that could not be sent to the element(s) to be configured is copied,
5. an event occurs and an address in a jump table is calculated on the basis of the source of the event,
6. a FIFO memory area which is run through before each reloading, and if the cell cannot be reloaded, the configuration data is copied closer to the beginning of the FIFO memory area or, if the cell can be reloaded, the configuration data is transferred to the cell,
7. the calculated jump table entry is read out, and the configuration data stored at the address read out is loaded into cells or copied to the FIFO memory area if the cell cannot be reprogrammed,

B) 8. the PLU returns to a state in which it can wait for events and respond to them.

2:Method according to Claim 1, characterized in that the configuration memory stores one or more configurations containing one or more complete configurations for one or more units.

3: Method according to Claim 1, characterized in that the configuration memory stores one or more subconfigurations representing only part of a complete configuration of one or more units.

4:Method according to Claim 1, characterized in that the PLU contains a start configuration register which points at a start configuration that puts the unit(s) in a valid state.

5: Method according to Claim 1, characterized in that the PLU contains a FIFO start register which points at the start of the specific memory area to which configuration data is copied.

6: Method according to Claim 1, characterized in that the PLU contains a FIFO end register which points at the end of the specific memory area to which configuration data are copied.

7: Method according to Claim 1, characterized in that the PLU contains a FIFO free entry register which points at the free entry of the specific memory area to which configuration data are copied and which is closest to the start of this memory area.

8:Method according to Claim 1, characterized in that the PLU contains a program counter register which points at the entry to be processed within the configuration

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memory.

9: Method according to Claim 1, characterized in that the PLU contains an address register which points at the address (number, coordinates, etc.) of the cell which has triggered an event.

10: Method according to Claim 1, characterized in that the PLU contains a data register containing configuration data which is transmitted to the cell in a reconfiguration.

11: Method according to claim 1, characterized in that the PLU contains a dispatch register which contains the address of the entry in the jump table calculated from the cell address.

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7. Definition of terms

Configurable element: A configurable element is a unit of a logic unit which can be set by a configuration string for a specific function. Configurable elements are thus all types of RAM cells, multiplexers, arithmetic logic units, registers and all types of internal and external interconnection description, etc.

Configuring: Setting the function and interconnection of a configurable element.

Configuration memory: The configuration memory contains one or more configuration strings.

Configuration string: A configuration string consists of a bit sequence of any length. This bit sequence represents a valid setting for the element to be configured, so that a functional element results.

PLU: Unit for configuring and reconfiguring programmable units. Embodied by a state machine or a microcontroller adapted specifically to its function.

Macro: A macro is a quantity of cells which together implement a task, function, etc.

Reconfiguring: New configuration of any number of configurable elements of a programmable unit while any remaining number of configurable elements continue their own functions (see configuring).

Feedback: Feedback is an action that can be triggered by a cell. With feedback, various pieces of information can be sent to the unit receiving the feedback.

Cell: See configurable element.

State machine: Logic unit which can assume various states. The transitions between states depend on various input parameters. These are known machines for controlling complex functions.